**Study program:** Integrated academic studies in Pharmacy

**Type and level of the study program:** integrated academic studies

**Course title: MATHEMATICS (PhI-MATH)**

**Teacher:** Dušanka M. Perišić

**Course status:** compulsory

**ECTS Credits: 4**

**Condition:** -

**Course aim:**

The basic objective of this course is to facilitate students to expand their knowledge in higher mathematics in order to understand phenomena in sciences, to create a scientific view of the world and to teach them how to use their mathematical knowledge in analyzing various problems in life sciences.

**Expected outcome of the course:**

Students acquire basic mathematical culture necessary to understand mathematical models of phenomena in various areas of life sciences.
Students completing this course can:

1. Use both the definition of derivative as a limit and the rules of differentiation to differentiate functions.
2. Sketch the graph of a function using asymptotes, critical points, and the derivative test for increasing/decreasing and concavity properties.
3. Set up max/min problems and use differentiation to solve them.
4. Set up related rates problems and use differentiation to solve them.
5. Evaluate integrals by using the Fundamental Theorem of Calculus.
6. Apply integration to analyze models in life sciences
7. Evaluate integrals using techniques of integration, such as substitution, inverse substitution, partial fractions and integration by parts.
8. Understand the inverse relationship between integration and differentiation
9. Set up and solve first order differential equations using separation of variables.

**Course description**

*Theoretical education:*

1. Concepts of functions, Limits and Continuity (Graph of a function, Inverse function, Parity, Symmetry and Periodicity, Limitation, Monotony, Extreme values, Limits and Continuity, Essential functions)
2. Differential calculus (Derivative of a function, Geometrical and physical interpretation of derivatives, Application to Graphing, Rates and Extremum Problems)
3. Approximations (Elements of the theory of errors, Linear and Polynomial Approximations, Polynomial interpolation)
4. Integral calculus (Definite and Indefinite Integration, The Fundamental Theorem of Calculus, Approximation of Definite Integration, Applications to Geometry and to Science )
5. Differential equations. Mathematical models.

*Practical education:*

Exercises are aligned to the lectures.

**Literature**

*Compulsory*:

1. Stewart J, Day T. Biocalculus, Calculus for Life Sciences. Cengage Learning, 2015.

*Additional*

1. Simmons GF. Calculus with Analytic Geometry, 2nd ed. McGraw-Hill New York, 1996.

| **Number of active classes** | | | | Other: |
|---|---|---|---|---|
| Lectures: 30 | Practice: 30 | Other types of teaching: | Research related activities: | |

**Teaching methods:**

Lectures, exercises and e-learning on a moodle platform.

**Student activity assessment** (maximally 100 points)

| **Pre-exam activities** | **points** | **Final exam** | **points** |
|---|---|---|---|
| Lectures | 5 | Written | |
| Homework | 10 | Oral | 35 |
| Colloquium I | 25 | | |
| Colloquium II | 25 | | |